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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/330,096	06/11/1999	JUN ENOMOTO	1110-0240P	8973

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EXAMINER	
MISLEH, JUSTIN P	
ART UNIT	**PAPER NUMBER**
2622	

DATE MAILED: 04/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/330,096	ENOMOTO, JUN	
	Examiner	Art Unit	
	Justin P. Misleh	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 11, 13, and 14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1 - 11 and 13* is/are allowed.

6)☒ Claim(s) *14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 June 1999* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 8, 2005 has been entered.

Response to Arguments

2. Applicant's arguments filed December 8, 2005 have been fully considered but they are not persuasive.

Specifically, Applicant argues "This section [column 4, lines 50 – 56] of Sekine nor anywhere else in Sekine does it teach or suggest forming beforehand an image of a region larger than a photographic region confirmed by a photographer on the image sensor element. The interpolation in Sekine creates picture elements between adjacent picture elements, and is not related to enlarging a region of an image to be photographed on the image sensor element."

The Examiner respectfully disagrees with Applicant's position. In Sekine (see figure 3 and column 4, lines 27 – 56), the distortion curve (42) represents the actual image captured due to lens distortion. The same image, including the distortion, is stored in the image memory (38). Sekine discloses that an amount of image memory (38) that was actually allocated to store the captured image represents more of a rectangular image (see solid line 44). Because of the

discrepancy between what is actually stored (distorted image within curved distortion boundary 42) and what has been allocated for image storage (rectangular curve line 44), Sekine interpolates to reconfigure the distorted image (specifically, line 42) such that it coincides with allocated space (specifically, line 44). Clearly, the rectangular image region (line 44), after correction (i.e. after interpolating has filled in the missing pixels) is "larger" than the distorted image that was captured (image with line 42). Sekine has effectively generated a corrected image that occupies a larger region than what was actually captured by the photographer.

The Examiner agrees that Sekine's invention is somewhat different that Applicant's invention (shown in figures 3A- 3C and discussed on page 19); however, Applicant's claim language is written broadly enough such that it does not necessary require Applicant's invention as disclosed. For instance, Applicant's language (Claim 14) requires, therein, "an image of a region larger than a photographic region confirmed by a photographer in accordance with missing of pixels is caused as a result of the correction."

As previously mentioned, the Examiner considers the captured image (42) in Sekine to be the claimed "photographic region to be confirmed by the photographer" and also considers Sekine's corrected image (44) to be the claimed "image of a region larger than a photographic region". Finally, Sekine makes it absolutely clear that corrected image (44) is larger (both physically and virtually) than the captured image (42), thus satisfying "in accordance with missing of pixels which is caused as a result of the correction".

Finally, it is noted that Claim 14 is absolutely silent with respect to the relationship between the image that is actually captured, the image that is corrected for distortions, and the image that is displayed – a critical feature of figures 3A – 3C. Nowhere in Claim 14 can it be construed that the "photographic region confirmed by a photographer" somehow corresponds to a displayed image.

For these reasons, the Examiner believes Sekine's teachings adequately discloses the above-recited portion of the claimed invention presented in Claim 14.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sekine et al. in view of Yokota et al.

5. For **Claim 14**, Sekine et al. disclose, as shown in figures 1 and 2, a digital image shooting device, comprising:

an image forming zoom lens (zoom lens 12);

an image sensor element (solid-state image sensors 14, 16, and 18);

a data processing unit for processing an output signal from said image sensor element (14, 16, and 18) into digital image data (see detailed explanation below);

an image memory (video tape) for storing the digital image data (color video output) and a lens characteristic (aberration information code) relating to the image forming lens (zoom lens 12; again see detailed explanation below);

a lens characteristic correction unit (figure 2 and as stated in column 4, lines 9 – 13 and 18 – 27) for performing, by using the stored lens characteristic of said image forming lens and a position of a frame image photographed (stored in the video tape), a process of correcting a position of a frame image photographed (by means of image memory 38), a process of correcting a deterioration of an image quality derived from said image forming lens upon the entire digital image data (by means of computing circuit 40),

wherein an image of a region larger than a photographic region confirmed by a photographer is formed on said image sensor element (14, 16, and 18) in accordance with missing of pixels which is caused as a result of the correction by said lens characteristic correction unit (As indicated in figure 2 and column 4, lines 50 – 56, the correction performed by the lens characteristic unit involves interpolation between adjacent picture elements.).

In Sekine (see figure 3 and column 4, lines 27 – 56), the distortion curve (42) represents the actual image captured due to lens distortion. The same image, including the distortion, is stored in the image memory (38). Sekine discloses that an amount of image memory (38) that was actually allocated to store the captured image represents more of a rectangular image (see solid line 44). Because of the discrepancy between what is actually stored (distorted image within curved distortion boundary 42) and what has been allocated for image storage (rectangular curve line 44), Sekine interpolates to reconfigure the distorted image (specifically, line 42) such that it coincides with allocated space (specifically, line 44). Clearly, the

rectangular image region (line 44), after correction (i.e. after interpolating has filled in the missing pixels) is "larger" than the distorted image that was captured (image with line 42). Sekine has effectively generated a corrected image that occupies a larger region than what was actually captured by the photographer.

However, in regards to the data processing unit, Sekine et al. is silent with regard to a data processing unit for generating digital image data, however, a video signal processing circuit (20) is provided, which performs known processes on the outputs of the image sensor element. A recording circuit (22) records the color video output of the video signal processing circuit (20) on a video tape together with an aberration information code which is digitized and provided by a ROM (32). Thus, since the aberration information code is recorded together with the color video output onto the video tape, it is inherent that either the known processes performed by the video processing circuit (20) or the recording circuit (22) at least include a step to digitize the color video output. If the color video output were not digitized, it would be impossible to record it together with the digitized aberration information code on the video tape.

Additionally, in regards to the lens characteristic, Sekine et al. disclose, as stated in column 3 (lines 34 – 36 and 49 – 67), an aberration information code, which has been digitized by the A/D (30). The aberration information provided to the A/D (30) is generated by the potentiometers (24, 26, and 28) of the zoom lens (12). The potentiometers (24, 26, and 28) detect the object distance, focal length, aperture value of the iris of the zoom lens (12), respectively. An A/D (30) is arranged to digitize the outputs of the potentiometers (24, 26, and 28). The digitized potentiometer (24, 26, and 28) outputs are provided to a digital microcomputer (34), which compares them to tabular codes stored in ROM (32) to generate a

digital aberration information code to be recorded with the color video output, on a video tape, in the recording circuit (22). Therefore, for each new object distance, focal length, and/or aperture value of the iris of the zoom lens (12), a new aberration information code is generated and recorded together with the color video output.

Finally, Sekine et al. teach that the process of correcting image quality does not have to be carried out in real time. Therefore, Sekine et al. does not disclose a process of correcting image quality wherein the image data is processed then stored in an image memory prior to capturing the next image or in an alternative mode, the image data is processed while at the same time image shooting device captures another image and the processed image data is either stored in the image memory during the capturing of the image or directly thereafter.

On the other hand, Yokota et al. also disclose a digital image shooting device that is concerned with correcting image quality. More specifically, Yokota et al. teach, as stated in column 6 (lines 54 – 57 and 65 – 67), that first image memory (103) is provided for memorizing distorted image data obtained from the image sensor (101), that the second image memory (104) is provided for memorizing distortion corrected image data, and that the image controlling circuit (102) processes the distorted image data into the distortion corrected image data and further converts the distortion corrected image data into a video signal. Furthermore, Yokota et al. note, in column 7 (lines 1 – 5), that the first image memory (103) memorizes one digital image frame (of the video signal comprising a plurality of frames) and that the outputted video signal conforms to an NTSC system (30 frames/second). Finally, Yokota et al. recites, in column 7 (lines 60 – 62), that the corrected image data is sequentially memorized in the second image memory (104).

Based upon the facts recited above, it is clear that Yokota et al. is directed towards a standard digital video camera wherein each of the frames of the video signal is distorted upon capture such that each distorted frame is corrected in real-time to yield a distortion free video signal. Since the first memory is a single frame buffer and distortion processing is performed upon reading a video frame from the first memory, to prevent total failure of the video camera Yokota et al. must operate by processing distorted image data either before a shooting of a next frame or during the shooting of the next frame.

As stated in column 1 (lines 43 – 60) of Yokota et al., at the time the invention was made, it would have been obvious to one with ordinary skill in the art to have included a process of correcting image quality wherein the image data is processed then stored in an image memory prior to capturing the next frame, as taught by Yokota et al., in the digital image shooting device, disclosed by Sekine et al., for the advantage of reducing computing processing, reducing computing processing time, and reducing circuit complexity.

Allowable Subject Matter

6. **Claims 1 – 11 and 13** are allowed.

7. The following is a statement of reasons for the indication of allowable subject matter:

While the closest prior art teaches correcting chromatic aberrations, distortion aberrations, and marginal luminance of an image capturing lens using stored lens characteristic data representing characteristics of the image capturing lens, wherein correction of an obtained distorted image is carried out in real-time before or during the shooting of a next frame;

The closest prior art does not teach of fairly suggest wherein the image data comprises three primary color-based image data and wherein the correction involves a correction unit that calculates a first deviation quantity of a first color-based image data due to the deterioration of the image quality, the first color-based image data selected among the three primary color-based image data, and calculates second deviation quantities of two color-based image data other than the first color-based image data on a basis of the calculated first deviation quantity, the second deviation quantities representing relative quantities to the first deviation quantities, and performs the process of correcting the deterioration of the image quality using the first deviation quantity and the second deviation quantities.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Justin P Misleh whose telephone number is 571.272.7313. The Examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, David L Ometz can be reached on 571.272.7593. The fax phone number for the organization where this application or proceeding is assigned is 571.273.3000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
April 13, 2006

DAVID OMETZ
SUPERVISORY PATENT EXAMINER